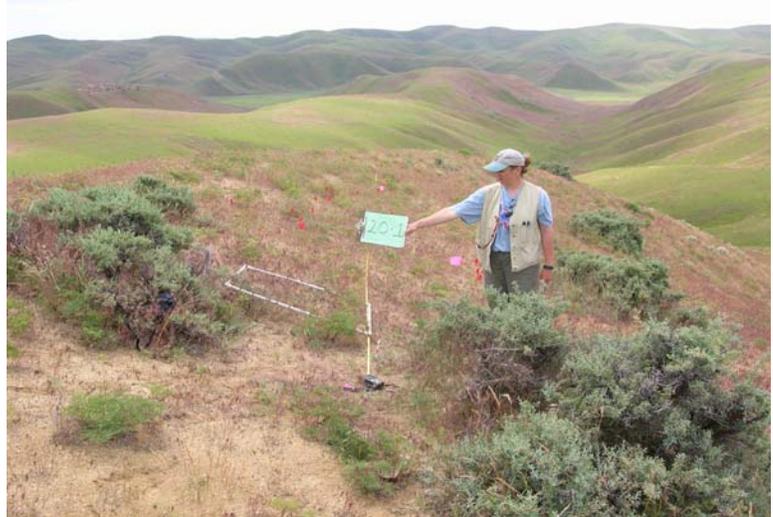


**MONITORING MULFORD'S MILKVETCH
(*ASTRAGALUS MULFORDIAE*)
IN SOUTHWESTERN IDAHO:
2005 RESULTS**



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ABSTRACT

Mulford's milkvetch (*Astragalus mulfordiae*) is a slender perennial forb endemic to southwestern Idaho and adjacent eastern Oregon. It is a priority conservation concern in both states. A program to monitor the long-term conservation of Mulford's milkvetch in Idaho was initiated in 1999. Since then, additional occurrences have been incrementally added to the program. A total of 25 occurrences (33 transects) are now included in the monitoring program. This represents all but one of the known occurrences located on public land in Idaho, including BLM, City of Boise, and Ada County property. The objective of the monitoring program is to collect Mulford's milkvetch census, introduced weed abundance, ground disturbance, and plant community trend information.

In 2005, reproductive plants dominated most transects in the Boise Foothills and Weiser areas, but non-reproductive plants were the most common life stage at many of the Owyhee Front transects. Seedlings were absent from nearly half (44%) of all transects. Cheatgrass (*Bromus tectorum*) was recorded at every transect. It contributed the most weed species cover at all transects in the Owyhee Front and Weiser areas, and at nearly all transects in the Boise Foothills. In general, transects in the Boise Foothills and Weiser areas had substantially greater ground disturbance compared to the Owyhee Front. Off-road vehicle use was not recorded on any transect and recent cattle use at only a few. Large-scale plant community changes have not occurred at any of the transects with multiple years of monitoring information. An initial assessment indicates the number of Mulford's milkvetch plants, habitat conditions, and ground disturbance trends to be stable at most Owyhee Front occurrences. In the Boise Foothills, Mulford's milkvetch abundance may be declining at a few occurrences. Most occurrences in this area show no clear habitat condition and disturbance trends. I recommend monitoring continue on a regular basis to ensure managers are kept apprised of population and habitat condition trends, the status of disturbances and threats, and to evaluate whether directed management actions have their intended effect.

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INTRODUCTION

Mulford's milkvetch (*Astragalus mulfordiae*) is a slender, spring-flowering, perennial forb in the legume family endemic to southwestern Idaho and adjacent eastern Oregon. Its Idaho distribution includes three separate population centers - the Owyhee Front (northern Owyhee County), the Boise Foothills, and the Weiser area (Figure 1). Mulford's milkvetch occupies loose, sandy substrates derived from lacustrine and alluvial sediments, including unconsolidated sands, decomposed sandstone, and oolitic limestone. It occurs primarily on dry, southerly to west-facing aspects in association with shrub-steppe communities dominated by antelope bitterbrush (*Purshia tridentata*), or in Owyhee County, an open mix of desert shrubs such as fourwing saltbrush (*Atriplex canescens*), horsebrush (*Tetradymia glabrata*), and rabbitbrush (*Chrysothamnus* spp.). More information concerning the distribution, habitat, and ecology of Mulford's milkvetch is detailed in other reports (e.g., Mancuso 1999a, Moseley 1989).

Mulford's milkvetch is known from 28 extant occurrences in Idaho (Colket et al. 2006, Idaho Conservation Data Center 2006). Most have <500 plants, and several in the Boise Foothills and Owyhee Front have been extirpated or reduced in size (Moseley 1989, U.S. Fish and Wildlife Service 1995). Nearly all occurrences in the Owyhee Front area are located on Bureau of Land Management (BLM) land. Many occurrences elsewhere in Idaho are located fully or partially on private land. The conservation of Mulford's milkvetch in each of the three population centers is important to ensure the species' long-term persistence in Idaho.

A major conservation threat throughout Idaho is habitat degradation, especially weed invasion associated with wildfire, off-road motorized vehicles (ORVs), and livestock grazing disturbances (Moseley 1989, U.S. Fish and Wildlife Service 1995, Mancuso 1999a). Habitat loss due to urban development is a chronic threat in the Boise Foothills. Mulford's milkvetch's limited distribution, tendency to occur in low numbers, and habitat loss and degradation problems have made it a priority conservation target for the BLM in both Oregon and Idaho for many years. It is a Type 2 special status plant species for the Idaho BLM, a category reserved for species that are imperiled rangewide and have a high likelihood of being federally listed in the foreseeable future due to their global rarity and significant endangerment factors (Bureau of Land Management 2003). Mulford's milkvetch was a federal candidate species until 1996 (U.S. Fish and Wildlife Service 1996), and continues to be a conservation concern for the U.S. Fish and Wildlife Service's (USFWS) Snake River Office in Boise.

In 1999, a pilot monitoring program was established at Camels Back Reserve in Boise as a cooperative project between the Boise Parks and Recreation Department and the Idaho Conservation Data Center (IDCDC; Mancuso 1999b). The USFWS funded the IDCDC to monitor seven additional Boise Foothill occurrences located at least partly on public land in 2000 (Mancuso 2001). All eight Boise Foothill occurrences were sampled again in 2001 with funding provided by the USFWS (Mancuso 2002). A subset of Boise Foothill occurrences were monitored in 2002 as a volunteer effort sponsored by the IDCDC (unpublished data). In 2003, the BLM Lower Snake River District contracted the IDCDC to initiate a monitoring program for Mulford's milkvetch in northern Owyhee County. Monitoring transects were established at five Mulford's milkvetch occurrences at this time (Mancuso and Miller 2004). In 2004, monitoring in northern Owyhee County was expanded to include five additional occurrences located on BLM property (Mancuso and Colket 2005). In 2005, the monitoring program was further expanded to include seven more occurrences located on BLM land in northern Owyhee County and the Weiser area. A total of 25 Mulford's milkvetch occurrences are now part of what has evolved to be a comprehensive monitoring program for Idaho. These include all known occurrences located on public land (BLM, City of Boise, and Ada County) as of 2005. The only exception is

an occurrence on BLM land south of Bruneau that was not relocated despite searches by the IDCDC in 2004 and 2005.

The objective of the monitoring program is to provide long-term population, habitat, and disturbance trend information for Mulford's milkvetch occurrences. Monitoring information is needed to help BLM and other resource managers be pro-active in their conservation efforts for Mulford's milkvetch. This will help them meet stewardship objectives such as maintaining viable populations of special status plant species on lands they administer within a multiple-use management framework. Monitoring conducted by the IDCDC in 2005 was funded by the USFWS for the Boise Foothills, and by the BLM for the northern Owyhee County and Weiser areas. This report provides a review of the monitoring methods and a summary and discussion of our 2005 results.

METHODS

Monitoring was conducted between 12 May and 6 July, 2005. Eighteen occurrences with previously established monitoring plots were resampled. In addition, we established plots and collected baseline monitoring information at 7 new occurrences, 2 of these in the Owyhee Front, and 5 in the Weiser area. Seven occurrences have multiple (2 or 3) transects. A total of 33 transects have been established at the 25 occurrences included in the monitoring program. Table 1 lists the occurrences, their ownership, and the year monitoring originated.

Information concerning the history of the monitoring protocol and plot selection has been described in earlier reports (Mancuso 2001, Mancuso and Colket 2005). The monitoring protocol is designed to collect Mulford's milkvetch census, introduced weed abundance, ground disturbance, and plant community information. Photo point photographs are also part of the protocol.

Mulford's milkvetch census, introduced weed, and ground disturbance monitoring information is collected along a variable length belt transect. A red-painted rebar stake marks the location and starting point for each transect and a large metal spike references the transect end point. Transects range in length from 15 to 30 m. To sample, a metric tape is stretched between the start and end points. Beginning at the 1-m mark, a 1-m square quadrat (microplot) is aligned flush against the tape. Sampling occurs at each meter mark along the transect tape.

GPS coordinates, transect length and azimuth, side of tape sampled, and other sampling information for each transect is summarized in Appendix 1. The map location for each transect is in Appendix 2. Appendix 3 includes a sketch map with landmarks, and other information to help relocate transects. The Element Occurrence (EO) number (a numerical identifier for each occurrence in the IDCDC database) was used to label and identify each transect. Protocols for each component of the monitoring program are outlined below.

Mulford's milkvetch census monitoring

Census and density information is collected by counting every Mulford's milkvetch plant rooted within the microplot and assigning each individual to one of three life stage class categories: (1) Reproductive stage class (R) - individuals with flowers and/or fruits; (2) Non-reproductive stage class (N) - individuals >4 cm tall without flowers or fruits; Seedling stage class (S) - non-reproductive individuals <4 cm tall (or taller if cotyledons are present). Small, plants have proven difficult to consistently assign to either the non-reproductive or seedling stage class. The addition of a size (height) criterion to the two classes will hopefully eliminate this inconsistency. Application of the size standard will result in small plants >1 year old being recorded as

seedlings, when really they are not. The seedling life stage should therefore be interpreted to possibly include individuals that are not recent germinants. An intermediate life stage (“small plants” = P) was used in 2005, but did not prove satisfactory. Plants scored as “small plants” on 2005 data sheets were later added to the seedling life stage count for data compilation purposes.

In addition to stage class, the location of each Mulford’s milkvetch plant is recorded by referencing the appropriate microplot frame cell in which the plant occurs. The microplot plot frame is divided into nine equal segments or cells referenced by the letters A through I. Cell “A” is positioned so it is at the top, left corner, similar to reading a page of newsprint.

Disturbance factor monitoring

Information regarding a series of disturbance attributes is recorded for each microplot along the transect, including:

(1) Weed species: The area occupied by each introduced weed species rooted within the microplot is estimated and assigned to one of the following five cover class values: 1 = <1% (trace); 2 = 1 - 10%; 3 = 11 - 25%; 4 = 26 - 50%; 5 = >50%. A total weed cover class is also assigned to each microplot.

(2) Ground disturbances: The area occupied by each surface disturbance such as ORV tracks, wildlife and cattle prints, or other disturbances within the microplot is estimated and assigned to one of the five cover classes described above. The assigned value represents the percentage of ground surface within the microplot clearly broken, crushed, or sloughed for each type of ground disturbance. A total ground disturbance cover class is also assigned to each microplot.

(3) Insect damage and disease: Each plant is inspected for evidence of insect and/or disease damage.

(4) Herbivory and trampling; Each plant is inspected for evidence of non-insect herbivory or trampling damage.

Plant community monitoring

At each transect, plant community and other ecological data are collected for Mulford’s milkvetch habitat using the methods of Bourgeron et al. (1992). Plant community information is based on visual estimates of cover class values for all vascular plant species occurring in a 0.03-ha (0.1-ac) circular plot (11.3-m; 37-ft radius). Estimates are also made for ground cover categories such as bare ground, litter, and microbotic crust. Plant community cover class values are as follows:

1 = <1%	30 = 25 – 34.9%	70 = 65 – 74.9%
3 = 1 – 4.9%	40 = 35 – 44.9%	80 = 75 – 84.9%
10 = 5 – 14.9%	50 = 45 – 54.9%	90 = 85 – 94.9%
20 = 15 – 24.9%	60 = 55 – 64.9%	98 = 95 – 100%

Cover class mid-points are used for discussing results. Plant community changes are monitored by comparing the plant species and cover class values recorded one year against another year. This method has an acceptable accuracy standard of +/- one cover class and requires an increase or decrease of two or more classes to indicate measurable change.

For most plots, the plant community plot center is measured 11.3 m from the transect rebar marker stake using an azimuth perpendicular to the transect azimuth (transect azimuth + 90°). This positions the rebar stake at the edge of the plot and minimizes trampling along the transect while collecting plant community information. Deviations from this layout are explained in the transect sampling notes (Appendix 1). Nomenclature for most plant names follows Intermountain Flora (Cronquist et al. 1977, 1984, 1989, 1994, 1997, Holmgren et al. 2003).

Photo points

Repeat photo monitoring is useful to document site-specific change or lack of change to landscape features of interest (Hall 2001). Beginning in 2005, all images were taken using a digital camera set at wide angle. Previous years used either 35 mm print film, or a mix of print film and digital images. The transect rebar marker stake serves as the reference point (the photo point) from which the photos are taken. A minimum of six photos are taken at each monitoring site. Four photos, taken at bearings of 0°, 90°, 180°, and 270° provide a panoramic overview of the monitoring site area. The remaining photos are for the immediate transect area. One is taken standing 3 m behind the rebar marker stake along the transect azimuth; the other while standing 3 m behind the end stake along the back azimuth. Additional photos to show the plant community plot, disturbances, or other landscape features are optional.

RESULTS

Mulford's milkvetch census monitoring

A total of 821 Mulford's milkvetch plants were tallied at the 33 transects in 2005. The number of plants/transect ranged from 1 to 99. All but 4 transects had <50 individuals. The Boise Foothills and Owyhee Front both averaged 24 Mulford's milkvetch plants/transect. Weiser area transects averaged 32 plants. Reproductive plants (50%) were the most common life stage, followed by the non-reproductive (37%) and seedling (13%) life stages. Reproductive plants dominated most transects in the Boise Foothills and Weiser area, but non-reproductive plants were the most common life stage at many of the Owyhee Front transects. Seedlings were absent from nearly half (44%) of all transects sampled. The most substantial decrease in seedling abundance was in the Boise Foothills. Census information for 2005, and comparative data from previous monitoring years are listed in Tables 2, 3, and 4 for the Boise Foothills, Owyhee Front, and Weiser areas, respectively. Figure 2 summarizes the 2005 census dataset for the three population centers. Copies of the 2005 census information field data sheets are in Appendix 4.

Disturbance monitoring

Weed species

All 33 monitoring transects had one or more introduced weed species recorded in 2005. Of the 16 weed species recorded, 12 were forbs and 4 were grasses. Most weeds are annual species, with bulbous bluegrass (*Poa bulbosa*) and rush skeletonweed (*Chondrilla juncea*) being the only perennials. Cheatgrass (*Bromus tectorum*) was the only weed recorded at every transect. It had the highest weed species cover at all transects in the Owyhee Front and Weiser areas, and at nearly all transects in the Boise Foothills. Storksbill (*Erodium cicutarium*) was the only other weed species recorded on >50% of the transects. Other weed species contributed <1% cover except for bulbous bluegrass, storksbill, and desert alyssum (*Alyssum desertorum*) at a few transects in the Boise Foothill and Weiser areas. In 2005, rush skeletonweed was recorded at 2 new transects, and cereal rye (*Secale cereale*) at 4 new transects in the Boise Foothills. Storksbill, burningbush (*Kochia scoparia*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), and tumbled mustard (*Sisymbrium altissimum*) were recorded at trace levels at one or more transects in the Owyhee Front for the first time. A majority (56%) of the weed

species were restricted to one of the three Mulford's milkvetch population centers. Overall, the 2005 weed cover patterns were similar to previous monitoring years. Table 5 shows the number of transects each weed was recorded by geographic region. Tables 6, 7, and 8 summarize weed cover data from each monitoring year for the Boise Foothills, Owyhee Front, and Weiser areas, respectively. Copies of the 2005 weed species/ground disturbance field data sheets are in Appendix 5. A spreadsheet in Appendix 6 summarizes the weed cover dataset for all monitoring years.

Ground disturbance

The loose, sandy soil characterizing Mulford's milkvetch habitat readily leaves evidence of sloughing, compression, churning, and other disturbances. All transects had some level of ground disturbance, with disturbance cover values ranging from <0.1% to 73%. Eleven transects (34%) had <1% ground disturbance cover, while 10 transects (31%) had >5% cover. In general, transects in the Boise Foothills and Weiser areas had substantially higher ground disturbance values compared to the Owyhee Front. Ground disturbances identified in 2005, included footprints, deer prints, unknown animal prints, cattle prints, cattle feces, small burrows, dirt piles, anthills, substrate sloughing, erosion rills, game trails, and divots of uncertain origin. Divots of uncertain origin were the most commonly recorded ground disturbance. In most cases, these divots were likely caused by tracking wildlife or domestic animals, but they lacked sufficient definition to positively identify their source.

In the Boise Foothills, deer or other animal prints and animal digging piles were the primary disturbance at several occurrences. Ground sloughing, rill erosion, and footprints continue to be recorded on transects alongside open and closed trails at Camels Back Reserve. In the Owyhee Front, motorcycle or other ORV tracks were observed at the Noble Island monitoring site in 2003 and 2004, but not in 2005. ORV tracks were not recorded at any other monitoring transects in 2005, although tracks pass very close to the new transect established at the Twentymile Gulch North occurrence (EO 24). Cattle feces recorded at several transects (Vinson Wash EO 10, Twentymile Gulch EO 11, Con Shea Basin EO 13, Lower Vinson Wash EO 25, and Sandhill Point EO 26) appeared to be old. Prints positively identified as cattle were recorded only at SE of Guffey Butte (EO 22). In the Weiser area, divots that appeared to be from cattle, but could not be identified with certainty were common at the Trail's Sand Hill (EO 3) and Sand Hollow (EO 20) occurrences. Divots that contributed substantial ground disturbance at the Cherry Gulch NE (EO 12) and Sagebrush Hill (EO 16) occurrences were very likely deer tracks. Tables 9, 10, and 11 summarize total disturbance cover class averages from each monitoring year for the Boise Foothills, Owyhee Front, and Weiser area, respectively. A spreadsheet in Appendix 7 summarizes the ground disturbance cover dataset for all monitoring years.

Insect damage and disease

The only evidence of possible disease was black speckling on the foliage observed on one Mulford's milkvetch plant at Trail's Sand Hill (EO 3) and one plant at Sand Hollow (EO 20). Both of these occurrences are located in the Weiser area. We did not see any evidence of insect damage.

Herbivory and trampling

Herbivory was recorded on Mulford's milkvetch at 4 transects, including 5 plants at Middle Stewart Gulch (EO 18) in the Boise Foothills; 5 plants at South of Sugar Valley (EO 2), and all 3 plants tallied at Horse Hill (EO 4) in the Owyhee Front; and 2 plants at Rebecca Sand Hill (EO 8) in the Weiser area. Herbivory appeared to be from rabbits at South of Sugar Valley. Herbivory sources at the other occurrences were not clear.

Plant community monitoring

Plant community sampling was conducted at all transect sites in 2005. Boise Foothills and Weiser area monitoring sites typically had a bitterbrush (*Purshia tridentata*) and/or rabbitbrush (*Chrysothamnus* spp.) shrub layer, an understory dominated by cheatgrass with lesser amounts of native bunchgrass species, especially needle-and-thread (*Stipa comata*), and low cover by a diverse set of forb species. Some of these sites appear to represent bitterbrush/needle-and-thread habitat types (Hironaka et al. 1983). Plant communities in the Owyhee Front tended to be characterized by a mix of desert shrub species, with cheatgrass dominating or co-dominating the understory at some sites, but being sparse at others. Needle-and-thread or Indian ricegrass (*Oryzopsis hymenoides*) were common native bunchgrasses. Forb diversity was variable, but always with low cover. These communities are not well represented in any ecological classification system. In 2005, the number of species in the 0.1 ac plant community plots ranged from 12 to 34 species, comparable to previous years. A total of 138 vascular plant species have been recorded since monitoring began, including 13 shrub, 15 grass, and 110 forbs. The majority (85%) are native species. Discounting the shrubs, 66 species (53%) are annual and 59 (47%) perennial. The plant community type for each transect site is in Table 13.

Shrub cover was similar to past years at all plant community plots having multiple monitoring years. Cheatgrass, red threeawn (*Aristida longiseta*), and barren fescue (*Vulpia bromoides*) were the only grass species with measurable changes in abundance compared to previous years. Values for cheatgrass in 2005 were more than one cover class higher than previous years at 1 transect in the Boise Foothills and 4 transects in the Owyhee Front. Values were more than one cover class lower at 3 Boise Foothills and 1 Owyhee Front transect. Red threeawn abundance decreased more than one cover class compared to 2000 baseline values at two transects in the Boise Foothills. Barren fescue abundance had a measurable increase at one transect in the Boise Foothills.

Measurable increase or decrease in abundance was not detected for any forb species at any transects. However, several plots had new aggressive weed species recorded for the first time in 2005. In the Boise Foothills, blue bachelor button (*Centaurea cyanus*) was recorded for the first time at 2 sites, and prickly lettuce (*Lactuca serriola*) at 3 sites. Prickly lettuce, Russian thistle (*Salsola tragus*), tumbled mustard (*Sisymbrium altissimum*), and burningbush (*Kochia scoparia*) were all new to one or more sites in the Owyhee Front. In all cases these weed species occurred at <1% cover. Aase's onion (*Allium aaseae*), a BLM special status plant species, was recorded at three Boise Foothill transects in past monitoring years, but only one in 2005. Most plots had one or more forb species recorded in 2005 that were not observed in past years. These were usually native annuals with <1% cover. Plant community changes are summarized in Table 14. Copies of the 2005 plant community field data sheets are in Appendix 8. The plant community dataset for all monitoring years is in Appendix 9.

Photo points

Photo point photographs were taken for all plots. A total of 208 digital images were put onto a CD and submitted to the BLM as part of this report.

DISCUSSION

The objective of the monitoring program is to provide long-term population, habitat, and disturbance trend information for Mulford's milkvetch occurrences. There are four possible trend outcomes - improving, declining, unclear, and stable.

Population

Improving trend - Mulford's milkvetch abundance increases over time compared to baseline numbers.

Declining trend - Mulford's milkvetch abundance decreases over time compared to baseline numbers.

No clear trend - Mulford's milkvetch abundance fluctuates year to year compared to baseline numbers.

Stable trend – Mulford's milkvetch abundance remains approximately the same compared to baseline numbers.

Habitat

Improving trend – Introduced weed species abundance (% cover) decreases compared to baseline numbers, and plant community sampling does not indicate a shift to an earlier seral stage over time.

Declining trend - Introduced weed species abundance (% cover) increases compared to baseline numbers, and/or plant community sampling indicates a shift to an earlier seral stage over time.

No clear trend - Introduced weed species abundance (% cover) fluctuates year to year compared to baseline numbers, and/or some weed species increasing, but others decreasing.

Stable trend - Introduced weed species abundance (% cover) remains approximately the same compared to baseline numbers, and plant community sampling does not indicate a shift in seral status over time.

Disturbance

Improving trend – The level (% cover) of ground disturbance decreases over time compared to baseline numbers.

Declining trend - The level (% cover) of ground disturbance increases over time compared to baseline numbers.

No clear trend - The level (% cover) of ground disturbance fluctuates year to year compared to baseline numbers, and/or some disturbances increase, but others decrease.

Stable trend - The level (% cover) of ground disturbance remains approximately the same over time compared to baseline numbers.

Southwestern Idaho has a semi-arid climate and environmental factors such as total and seasonal precipitation can vary substantially one year to the next. This natural environmental variability likely influences annual Mulford's milkvetch abundance. It can also influence the abundance of annual weeds such as cheatgrass. Baseline information collected the first few years of this monitoring program provide a reference for the natural range of variability for attributes such as Mulford's milkvetch abundance, weed species abundance, and plant community composition. Most Mulford's milkvetch occurrences have 3 years or less of monitoring information. This is enough sampling to get some ideas about the range of variability for measured attributes, but it is probably insufficient and premature to evaluate trends. Nonetheless, an initial trend assessment for the 17 Mulford's milkvetch transects (12 occurrences) that have been sampled at least 3 years is summarized in Table 14.

Research in Oregon has shown Mulford's milkvetch abundance can fluctuate substantially over time (Bureau of Land Management 1998, Pyke 1996). The number of Mulford's milkvetch plants, habitat conditions, and ground disturbance trends have remained relatively stable at most Owyhee Front occurrences. Improving habitat trend at the Con Shea Basin and Noble Island occurrences reflects reduced cheatgrass cover in 2004 and 2005, compared to 2003. Transects at these two occurrences had substantially lower ground disturbance in 2005

compared to previous years, but still more than other occurrences in the Owyhee Front area. In the Boise Foothills, Mulford's milkvetch abundance appears to be declining at several occurrences. Most occurrences in this area show no clear trend in habitat condition, largely due to a spike in cheatgrass cover in 2001, compared to previous or subsequent sampling years. Disturbance trends are also not clear at most occurrences. A declining trend at two occurrences reflects increased animal digging disturbance.

With the establishment of transects at occurrences in the Weiser area in 2005, the Mulford's milkvetch monitoring program now includes all three geographic regions where the species occurs in Idaho. Over the course of several years it has grown to become a comprehensive monitoring program for occurrences located on public land. A number of occurrences located on private land in the Boise Foothills are the main gap in the monitoring program. Low plant numbers and habitat vulnerability should keep Mulford's milkvetch a priority conservation concern for land managers. I recommend monitoring continue on a regular basis to ensure managers be kept apprised of population and habitat condition trends, the status of disturbances and threats, and to evaluate whether any directed management actions, such as fencing or modifying cattle allotment plan have their intended effect.

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Table 1. Mulford's milkvetch occurrences monitored in 2005.

EO #	Occurrence name	USGS quadrangle	Land ownership	Year originated
Boise Foothills				
15	Seaman Gulch	Eagle	Ada County	2000
18*	Middle Stewart Gulch	Boise North	BLM	2000
700	Military Reserve-Powderhouse Gulch	Boise North	Boise City	2000
701*	Military Reserve-Veterans Ridge	Boise South	Boise City	2000
705	Military Reserve-Cemetery Ridge E	Boise North	Boise City	2000
706	Military Reserve-Cemetery Ridge W	Boise North	Boise City	2000
708	Lower Hulls Gulch	Boise North	Boise City	2000
715*	Camels Back Reserve	Boise North	Boise City	1999
Owyhee Front				
2	South of Sugar Valley	Little Valley	BLM	2005
4	Horse Hill	Sugar Valley	BLM	2004
9*	Mud Flat Road	Purjue Canyon	BLM	2004
10*	Vinson Wash	Vinson Wash	BLM	2003
11	Twentymile Gulch	Grand View	BLM	2004
13	Con Shea Basin	Initial Point	BLM	2003
14	Noble Island	Walters Butte	BLM	2003
22	SE of Guffey Butte	Walters Butte	BLM	2003
23	West of Shoofly Creek	Chalk Hills	BLM	2004
24	Twentymile Gulch N	Purjue Canyon	BLM	2005
25	Lower Vinson Wash	Vinson Wash	BLM	2003
26	Sandhill Point	Vinson Wash	BLM	2004
Weiser				
3	Trail's Sand Hill	Birding Island	BLM	2005
8*	Rebecca Sand Hill	Weiser Cove Mann Creek SE	BLM	2005
12	Cherry Gulch NE	Weiser Cove	BLM	2005
16	Sagebrush Hill	Weiser North	BLM	2005
20*	Sand Hollow	Weiser Cove	BLM	2005

* = Occurrences with multiple monitoring transects.

Table 2. Mulford's milkvetch monitoring census information for the Boise Foothills, 1999-2005. Life stage percentages for each transect are in parentheses.

Trans. #	# Plants					Reproductive					Non-reproductive					Seedling				
	99	00	01	02	05	99	00	01	02	05	99	00	01	02	05	99	00	01	02	05
15-1	-	7	7	12	9	-	6 (86)	7 (100)	8 (67)	9 (100)	-	1 (14)	0	1 (8)	0	-	0	0	3 (25)	0
18-1	-	27	31	-	42	-	7 (26)	13 (42)	-	21 (50)	-	4 (15)	3 (10)	-	12 (29)	-	16 (59)	18 (58)	-	9 (21)
18-2	-	80	31	-	15	-	33 (41)	13 (42)	-	12 (80)	-	4 (5)	5 (16)	-	0	-	43 (54)	13 (42)	-	3 (20)
700-1	-	6	2	1	2	-	6 (100)	2 (100)	1 (100)	0	-	0	0	0	2 (100)	-	0	0	0	0
701-1	-	20	15	7	5	-	18 (90)	15 (100)	6 (86)	5 (100)	-	1 (5)	0	1 (14)	0	-	1 (5)	0	0	0
701-2	-	57	47	45	42	-	41 (72)	26 (55)	29 (64)	29 (69)	-	7 (12)	13 (28)	13 (29)	11 (26)	-	9 (16)	8 (17)	3 (7)	2 (5)
705-1	-	9	10	-	-	-	9 (100)	10 (100)	-	-	-	0	0	-	-	-	0	0	-	-
706-1	-	10	6	4	1	-	6 (60)	6 (100)	3 (75)	1 (100)	-	1 (10)	0	0	0	-	3 (30)	0	1 (25)	0
708-1	-	15	6	5	11	-	5 (33)	6 (100)	5 (100)	10 (91)	-	1 (7)	0	0	1 (9)	-	9 (60)	0	0	0
715-1	39	71	152	-	76	12 (31)	13 (18)	5 (3)	-	29 (38)	7 (18)	3 (4)	6 (4)	-	20 (26)	20 (51)	55 (78)	141 (93)	-	27 (36)
715-2	10	27	11	-	9	6 (60)	8 (30)	5 (46)	-	7 (78)	1 (10)	4 (15)	2 (18)	-	0	3 (30)	15 (55)	4 (36)	-	2 (22)
715-3	23	25	28	35	53	11 (48)	14 (56)	15 (54)	16 (46)	32 (60)	12 (52)	6 (24)	4 (14)	13 (37)	14 (26)	0	5 (20)	9 (32)	6 (17)	7 (13)
Total	72	354	346	109	265	29 (40)	166 (47)	123 (35)	68 (62)	155 (58)	20 (28)	32 (9)	33 (10)	28 (26)	60 (23)	23 (32)	156 (44)	190 (55)	13 (12)	50 (19)

Table 3. Mulford's milkvetch monitoring census information for the Owyhee Front, 2003-2005. Life stage percentages for each transect are in parentheses.

Transect	# Plants			Reproductive			Non-reproductive			Seedling		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
2-1	-	-	16	-	-	8 (50)	-	-	8 (50)	-	-	0
4-1	-	3	3	-	2 (67)	0	-	1 (33)	3 (100)	-	0	0
9-1	-	13	14	-	0	5 (36)	-	11 (85)	1 (7)	-	2 (15)	8 (57)
9-2	-	18	25	-	0	3 (12)	-	13 (72)	4 (16)	-	5 (28)	18 (72)
10-1	50	30	22	0	0	6 (27)	47 (94)	20 (67)	16 (73)	3 (6)	10 (33)	0
10-2	84	90	99	0	0	6 (6)	70 (83)	66 (73)	92 (92)	14 (17)	24 (27)	1 (1)
11-1	-	5	5	-	2 (40)	1 (20)	-	3 (60)	2 (40)	-	0	2 (40)
13-1	51	37	49	7 (14)	5 (14)	27 (55)	22 (43)	6 (16)	19 (39)	22 (43)	26 (70)	3 (6)
14-1	27	9	30	5 (19)	5 (56)	9 (30)	17 (62)	4 (44)	21 (70)	5 (19)	0	0
22-1	30	23	26	18 (60)	7 (30)	20 (77)	8 (27)	6 (26)	6 (23)	4 (13)	10 (44)	0
23-1	-	8	4	-	1 (13)	3 (75)	-	6 (75)	1 (25)	-	1 (13)	0
24-1	-	-	9	-	-	2 (22)	-	-	6 (67)	-	-	1 (11)
25-1	57	31	32	9 (16)	6 (19)	9 (28)	7 (12)	5 (16)	23 (72)	41 (72)	20 (65)	0
26-1	-	12	1	-	1 (8)	1 (100)	-	6 (50)	0	-	5 (42)	0
Total	299	279	335	39 (13)	29 (10)	100 (30)	171 (57)	147 (53)	202 (60)	89 (30)	103 (37)	33 (10)

Table 4. Mulford's milkvetch monitoring census information for the Weiser area, 2005. Life stage percentages for each transect are in parentheses.

Transect	# Plants	Reproductive	Non-reproductive	Seedling
3-1	11	9 (82)	1 (9)	1 (9)
8-1	42	30 (71)	4 (10)	8 (19)
8-2	13	12 (92)	0	1 (8)
12-1	22	11 (50)	9 (41)	2 (9)
16-1	25	18 (72)	4 (16)	3 (12)
20-1	99	68 (69)	26 (26)	5 (5)
20-2	9	9 (100)	0	0
Total	221	157 (71)	44 (20)	20 (9)

Table 5. Number of transects each weed species occurs by geographic region, 2005. Boise Foothills N = 11; Owyhee Front N = 14; Weiser area N = 7.

Scientific name	Common name	# of Transects		
		Boise Foothills	Owyhee Front	Weiser area
<i>Alyssum desertorum</i>	desert alyssum	6	0	3
<i>Artemisia dracunculus</i>	tarragon	0	0	1
<i>Bromus tectorum</i>	cheatgrass	11	14	7
<i>Centaurea cyanus</i>	blue bachelor buttons	4	0	0
<i>Chondrilla juncea</i>	rush skeletonweed	7	0	0
<i>Camelina microcarpa</i>	littlepod falseflax	0	1	0
<i>Erodium cicutarium</i>	storksbill	10	1	5
<i>Halogeton glomeratus</i>	halogeton	0	2	0
<i>Kochia scoparia</i>	burningbush	0	1	0
<i>Lactuca serriola</i>	prickly lettuce	1	2	4
<i>Poa bulbosa</i>	bulbous bluegrass	9	0	1
<i>Salsola tragus</i>	Russian thistle	0	9	0
<i>Secale cereale</i>	cereal rye	4	0	0
<i>Sisymbrium altissimum</i>	tumblemustard	4	1	1
<i>Taeniatherum caput-medusae</i>	meduseahead rye	0	0	1
<i>Tragopogon dubius</i>	yellow salsify	3	0	1

Table 6. Weed species abundance for Mulford's milkvetch monitoring transects in the Boise Foothills. Percent cover for each weed species is calculated by summing the cover class mid-points recorded at all microplots on the transect, divided by the number of microplots.

Transect	Occurrence name	Species	% Cover			
			2000	2001	2002	2005
15-1	Seamans Gulch	<i>Bromus tectorum</i>	14.5	23	15	16.2
		<i>Chondrilla juncea</i>				0.2*
		<i>Erodium cicutarium</i>	0.4	0.5	0.2	0.4
		<i>Tragopogon dubius</i>	0.08	0.04	0.02	0.3
		total	14.7	23	15	16.7
18-1	Middle Stewart Gulch	<i>Alyssum desertorum</i>	0.7	1	-	1.4
		<i>Bromus tectorum</i>	2.7	6.9	-	3.9
		<i>Erodium cicutarium</i>	0.2	0.2	-	0.7
		<i>Poa bulbosa</i>	2	3.7	-	0.2
		total	5.8	13.2	-	6.2
18-2	Middle Stewart Gulch	<i>Alyssum desertorum</i>	0.9	1.9	-	1.2
		<i>Bromus tectorum</i>	4.8	14.7	-	4.6
		<i>Erodium cicutarium</i>	0.06	0.1	-	0.1
		<i>Poa bulbosa</i>	0.2	6.7	-	0.06
		total	6.2	26.1	-	5.7
700-1	MR-Powerhouse Gulch	<i>Bromus tectorum</i>	52.7	69.1	28.6	28.8
		<i>Centaurea cyanus</i>	0.5	0.2	0.06	1.1
		<i>Chondrilla juncea</i>	0.02		0.7	0.2
		<i>Erodium cicutarium</i>	1.9	3	3.9	5
		<i>Poa bulbosa</i>		0.06	0.1	
		<i>Sisymbrium altissimum</i>	0.4	0.02		0.2
		total	60.1	70.6	30.9	38.6
701-1	MR-Veterans Ridge	<i>Bromus tectorum</i>	17.3	34.4	15.5	8.7
		<i>Centaurea cyanus</i>	0.08	0.04		0.06
		<i>Chondrilla juncea</i>			0.02	0.4
		<i>Erodium cicutarium</i>	0.3	0.3	0.06	
		<i>Poa bulbosa</i>	0.7	2.7	1.6	3
		<i>Tragopogon dubius</i>	0.04	0.06		
		<i>Sisymbrium altissimum</i>				0.02*
total	18.3	39.5	18.9	11.3		
701-2	MR-Veterans Ridge	<i>Bromus tectorum</i>	1.2	1.9	2.3	1.3
		<i>Chondrilla juncea</i>				0.04*
		<i>Erodium cicutarium</i>	0.3	0.4	0.3	0.3
		<i>Poa bulbosa</i>	1.8	2.8	2.1	3.5
		<i>Sisymbrium altissimum</i>				0.02*
		total	2.3	3.7	4.2	5.8
706-1	MR-Cemetery Ridge W	<i>Alyssum desertorum</i>				0.02
		<i>Bromus tectorum</i>	67.6	66	21.3	23
		<i>Chondrilla juncea</i>	0.06	0.2	0.6	0.6
		<i>Poa bulbosa</i>		0.04	0.2	0.06
		<i>Secale cereale</i>				0.5*
		<i>Tragopogon dubius</i>	0.02			
total	67.6	66	21.8	25.6		

Transect	Occurrence name	Species	% Cover			
			2000	2001	2002	2005
708-1	Lower Hulls Gulch	<i>Bromus tectorum</i>	9.9	22.5	14.4	5.7
		<i>Centaurea cyanus</i>	0.02	1.5	0.02	0.06
		<i>Chondrilla juncea</i>	0.7	1.1	1.1	2.6
		<i>Erodium cicutarium</i>	0.1	0.6	0.2	0.1
		<i>Lactuca serriola</i>	0.02	0.06		0.06
		total	11.5	28.4	15.7	8.9
715-1	Camels Back Reserve	<i>Alyssum desertorum</i>	0.5	0.5	-	2.7
		<i>Bromus tectorum</i>	1.6	5.9	-	1.2
		<i>Erodium cicutarium</i>	0.1	0.5	-	
		<i>Poa bulbosa</i>		0.3	-	0.3
		<i>Secale cereale</i>			-	1.4*
		<i>Sisymbrium altissimum</i>			-	0.1
		total	1.6	8.4	-	5
715-2	Camels Back Reserve	<i>Alyssum desertorum</i>	0.4	0.7	-	0.7
		<i>Bromus tectorum</i>	4.7	11.3	-	3.7
		<i>Erodium cicutarium</i>	0.3	0.4	-	0.6
		<i>Poa bulbosa</i>	0.4	0.08	-	0.3
		<i>Secale cereale</i>			-	0.1*
		<i>Sisymbrium altissimum</i>	0.1	0.04	-	
		total	5.2	13.3	-	5
715-3	Camels Back Reserve	<i>Alyssum desertorum</i>	0.02			
		<i>Bromus tectorum</i>	5.7	13.6	6.7	1.6
		<i>Centaurea cyanus</i>	0.2		0.02	0.1
		<i>Chondrilla juncea</i>	0.7	0.3	0.7	1
		<i>Erodium cicutarium</i>	0.4	0.6	0.4	
		<i>Poa bulbosa</i>		0.02	0.02	0.04
		<i>Secale cereale</i>				0.2*
		total	6.4	14.4	6.8	2.5

- = year not sampled

* = recorded on transect for first time in 2005

Table 7. Weed species abundance for Mulford's milkvetch monitoring transects in the Owyhee Front area. Percent cover for each weed species is calculated by summing the cover class mid-points recorded at all microplots on the transect, divided by the number of microplots.

Transect	Occurrence name	Species	% Cover		
			2003	2004	2005
2-1	South of Sugar Valley	<i>Bromus tectorum</i>	-	-	11
		total	-	-	11
4-1	Horse Hill	<i>Bromus tectorum</i>	-	6.7	44
		<i>Salsola tragus</i>	-	8.3	
		<i>Sisymbrium altissimum</i>	-	0.4	0.7
		total	-	15.1	44
9-1	Mud Flat Road	<i>Bromus tectorum</i>		0.4	4.9
		<i>Halogeton glomeratus</i>	-	0.3	
		total	-	0.7	0.7
9-2	Mud Flat Road	<i>Bromus tectorum</i>	-	0.7	3.9
		<i>Halogeton glomeratus</i>	-	0.1	
		total	-	0.7	3.9
10-1	Vinson Wash	<i>Bromus tectorum</i>	0.7	0.05	0.7
		<i>Salsola tragus</i>			0.1*
		total	0.7	0.05	0.7
10-2	Vinson Wash	<i>Bromus tectorum</i>	0.4	0.04	0.6
		<i>Kochia scoparia</i>			0.08*
		<i>Salsola tragus</i>			0.04*
		total	0.4	0.04	0.7
11-1	Twentymile Gulch	<i>Bromus tectorum</i>	-	0.5	5.6
		<i>Salsola tragus</i>	-		0.02*
		total	-	0.5	5.6
13-1	Con Shea Basin	<i>Bromus tectorum</i>	19.1	7.6	5.7
		<i>Erodium cicutarium</i>			0.1*
		<i>Salsola tragus</i>		0.3	0.5
		total	19.1	7.6	5.7
14-1	Noble Island	<i>Bromus tectorum</i>	18.8	4.8	9.7
		<i>Camelina microcarpa</i>	0.02		0.02
		<i>Lactuca serriola</i>			0.06*
		<i>Salsola tragus</i>			0.44*
		total	18.8	4.8	10.7
22-1	SE of Guffey Butte	<i>Bromus tectorum</i>	5.7	5.2	2.8
		<i>Lactuca serriola</i>		0.5	0.03
		<i>Salsola tragus</i>		1.8	0.8
		total	5.7	5.8	3.2
23-1	West of Shoofly Creek	<i>Bromus tectorum</i>	-	0.3	7.3
		total	-	0.3	7.3
24-1	Twentymile Gulch N	<i>Bromus tectorum</i>	-	-	1.6
		total	-	-	1.6
25-1	Lower Vinson Wash	<i>Bromus tectorum</i>	4.1	0.3	2.2
		<i>Salsola tragus</i>		5.2	0.5
		total	4.1	5.2	2.5

Transect	Occurrence name	Species	% Cover		
			2003	2004	2005
26-1	Sandhill Point	<i>Bromus tectorum</i>	-	1.9	12.7
		<i>Salsola tragus</i>	-	5.3	
		total	-	6.6	12.7

- = not sampled; * = recorded on transect for first time in 2005

Table 8. Weed species abundance for Mulford's milkvetch monitoring transects in the Weiser area. Percent cover for each weed species is calculated by summing the cover class mid-points recorded at all microplots on the transect, divided by the number of microplots.

Transect	Occurrence Name	Species	% Cover
			2005
3-1	Trail's Sand Hill	<i>Alyssum desertorum</i>	0.5
		<i>Bromus tectorum</i>	7.2
		<i>Erodium cicutarium</i>	0.6
		<i>Lactuca serriola</i>	0.02
		<i>Sisymbrium altissimum</i>	0.05
		total	7.2
8-1	Rebecca Sand Hill	<i>Alyssum desertorum</i>	0.3
		<i>Bromus tectorum</i>	1.5
		<i>Erodium cicutarium</i>	0.1
		<i>Poa bulbosa</i>	0.03
		total	1.8
8-2	Rebecca Sand Hill	<i>Alyssum desertorum</i>	0.4
		<i>Artemisia dracunculus</i>	0.4
		<i>Bromus tectorum</i>	3
		<i>Lactuca serriola</i>	0.02
		total	3.3
12-1	Cherry Gulch NE	<i>Bromus tectorum</i>	17.7
		<i>Erodium cicutarium</i>	2.5
		<i>Lactuca serriola</i>	0.4
		total	17.7
16-1	Sagebrush Hill	<i>Alyssum desertorum</i>	1.1
		<i>Bromus tectorum</i>	7.5
		<i>Erodium cicutarium</i>	0.02
		total	8
20-1	Sand Hollow	<i>Bromus tectorum</i>	2.3
		<i>Erodium cicutarium</i>	0.2
		<i>Taeniatherum caput-medusae</i>	0.02
		total	2.5
20-2	Sand Hollow	<i>Bromus tectorum</i>	4.4
		<i>Erodium cicutarium</i>	0.3
		<i>Lactuca serriola</i>	0.02
		<i>Tragopogon dubius</i>	0.3
		total	4.5

Table 9. Ground disturbance abundance for Mulford's milkvetch monitoring transects in the Boise Foothills. Percent cover for each disturbance is calculated by summing the cover class mid-points recorded at all microplots on the transect, divided by the number of microplots.

Transect	Occurrence name	Disturbance	% cover			
			2000	2001	2002	2005
15-1	Seamans Gulch	deer print	1.7	2.5		
		ground disturb.			3	
		divot				1.5
		total	1.7	2.5	3	1.5
18-1	Middle Stewart Gulch	deer print		38.9		4.4
		divot	9.1			
		cattle feces				0.3
		total	9.1	38.9		5.1
18-2	Middle Stewart Gulch	deer print	3.7	41		2
		divot				3.7
		total	3.7	41		4.9
700-1	MR-Powerhouse Gulch	animal print				0.2
		dirt pile				0.9
		ground disturb.	3	1.6	6.9	
		total	3	1.6	6.9	1.1
701-1	MR-Veterans Ridge	animal print				0.4
		dirt pile				3.3
		ground disturb.		0.2	5.2	
		total	0	0.2	5.2	3.5
701-2	MR-Veterans Ridge	animal print				0.3
		dirt pile				0.7
		footprint				4.2
		ground disturb.	9.6	3.5	11.9	
706-1	MR-Cemetery Ridge W	deer print				0.2
		divot		1.2		0.02
		ground disturb.	1.2		5.9	
		total	1.2	1.2	5.9	0.2
708-1	Lower Hulls Gulch	animal print				0.4
		dirt pile				12.9
		divot				1.4
		ground disturb.	3.5	9.1	13.2	
		total	3.5	9.1	13.2	14
715-1	Camels Back Reserve	footprint				0.4
		ground disturb.	73.5	73.5		
		sloughing				73.5
		total	73.5	73.5		73.5
715-2	Camels Back Reserve	divot				2.9
		ground disturb.	56.1	75		
		sloughing				9
		rill				3.6
		total	56.1	75		14.6
715-3	Camels Back Reserve	animal print				1.4
		dirt pile				1.7
		footprints	8.3			4.8
		ground disturb.		22.4	41.7	
		total	8.3	22.4	41.7	7.2

Table 10. Ground disturbance abundance for Mulford's milkvetch monitoring transects in the Owyhee Front. Percent cover for each disturbance is calculated by summing the cover class mid-points recorded at all microplots on the transect, divided by the number of microplots.

Transect	Occurrence name	Disturbance	% cover		
			2003	2004	2005
2-1	South of Sugar Valley	divot			0.7
		total			0.7
4-1	Horse Hill	divot		2.9	1.6
		small burrow		0.7	0.8
		total		3.6	2.4
9-1	Mud Flat Road	animal print			0.6
		small burrow		0.03	
		total		0.03	0.6
9-2	Mud Flat Road	animal print			0.2
		total		0	0.2
10-1	Vinson Wash	cattle feces		0.03	
		divot		0.03	0.08
		road edge	0.5	1	
		total	0.5	1.1	0.08
10-2	Vinson Wash	cattle feces	0.3	0.06	0.06
		divot		0.2	1
		motorcycle tread	0.2		
		small burrow	0.02		
		total	0.5	0.08	1
11-1	Twentymile Gulch	cattle feces		0.1	0.7
		divot		1.6	
		small burrow		2.8	0.9
		total		3.9	1.5
13-1	Con Shea Basin	cattle feces	0.1	0.1	0.1
		divot	5.8	24	2.2
		total	5.8	24	2.2
14-1	Noble Island	animal print			0.02
		divot	0.8	0.9	1.5
		footprint	1.4		
		ORV tread	2.4	6.3	
		small burrow		0.2	
		total	5.7	7.3	1.5
22-1	SE of Guffey Butte	cattle feces		0.02	0.2
		cattle print			0.2
		deer print	0.07		
		divot		1.7	0.5
		footprint		0.	
		total	0.07	1.9	0.8
23-1	West of Shoofly Creek	divot		1.5	0.3
		small burrow		1.1	0.1
		total		2.6	0.4
24-1	Twentymile Gulch N	small burrow			0.4
		total			0.4

Transect	Occurrence name	Disturbance	% cover		
			2003	2004	2005
25-1	Lower Vinson Wash	cattle feces	0.03	0.4	0.08
		divot	0.03	2.2	1
		small burrow	0.02	0.2	
		total	0.2	2.6	1
26-1	Sandhill Point	animal print			0.9
		cattle feces		0.4	0.2
		small burrow		0.05	
		total		0.5	1

Table 11. Ground disturbance abundance for Mulford's milkvetch monitoring transects in the Weiser area. Percent cover for each disturbance is calculated by summing the cover class mid-points recorded at all microplots on the transect, divided by the number of microplots.

Transect	Occurrence Name	Disturbance	% cover
			2005
3-1	Trail's Sand Hill	cattle feces	0.4
		divot	6.7
		footprint	1.2
		total	7.2
8-1	Rebecca Sand Hill	animal print	0.2
		dirt pile	0.9
		total	1.1
8-2	Rebecca Sand Hill	dirt pile	0.8
		game trail	1.3
		total	2.1
12-1	Cherry Gulch NE	deer print	0.3
		dirt pile	11.8
		divot	0.2
		total	12.4
16-1	Sagebrush Hill	dirt pile	0.3
		divot	5.4
		total	5.5
20-1	Sand Hollow	cattle feces	0.4
		divot	1.6
		total	2
20-2	Sand Hollow	anthill	0.2
		cattle feces	0.02
		divot	10.3
		total	10.5

Table 12. Plant community types for Mulford's milkvetch monitoring transects, 2005.

Transect	Occurrence Name	Plant community type
Boise Foothills		
15-1	Seaman Gulch	<i>Chrysothamnus</i> spp/ <i>Bromus tectorum</i> - <i>Poa secunda</i>
18-1 & 2	Middle Stewart Gulch	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Agropyron spicatum</i>
700-1	MR-Powderhouse Gulch	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Stipa comata</i>
701-1 & 2	MR-Veterans Ridge	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Stipa comata</i>
705	MR-Cemetery Ridge E	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Aristida longiseta</i>
706-1	MR-Cemetery Ridge W	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Stipa comata</i>
708-1	Lower Hulls Gulch	<i>Chrysothamnus</i> spp/ <i>Bromus tectorum</i> - <i>Aristida longiseta</i>
715-1	Camels Back Reserve	<i>Chrysothamnus</i> spp/ <i>Bromus tectorum</i> - <i>Stipa comata</i>
715-2	Camels Back Reserve	<i>Chrysothamnus</i> spp/ <i>Bromus tectorum</i> - <i>Stipa comata</i>
715-3	Camels Back Reserve	<i>Chrysothamnus</i> spp/ <i>Bromus tectorum</i> - <i>Stipa comata</i>
Owyhee Front		
2-1	South of Sugar Valley	Mix desert shrub/ <i>Bromus tectorum</i> - <i>Oryzopsis hymenoides</i>
4-1	Horse Hill	Mix desert shrub/ <i>Bromus tectorum</i> - <i>Stipa comata</i>
9-1 & 2	Mud Flat Road	Mix desert shrub/ <i>Oryzopsis hymenoides</i>
10-1	Vinson Wash	Mix desert shrub/ <i>Stipa comata</i>
10-2	Vinson Wash	Mix desert shrub/ <i>Stipa comata</i>
11	Twentymile Gulch	Mix desert shrub/ <i>Oryzopsis hymenoides</i>
13	Con Shea Basin	Mix desert shrub/ <i>Bromus tectorum</i> - <i>Oryzopsis hymenoides</i>
14	Noble Island	Mix desert shrub/ <i>Stipa comata</i>
22	SE of Guffey Butte	Mix desert shrub/ <i>Oryzopsis hymenoides</i>
23	West of Shoofly Creek	Mix desert shrub/ <i>Bromus tectorum</i>
24	Twentymile Gulch N	Mix desert shrub/ <i>Bromus tectorum</i> - <i>Oryzopsis hymenoides</i>
25	Lower Vinson Wash	Mix desert shrub/ <i>Stipa comata</i>
26	Sandhill Point	Mix desert shrub/ <i>Bromus tectorum</i> - <i>Stipa comata</i>
Weiser area		
3	Trail's Sand Hill	<i>Bromus tectorum</i>
8-1	Rebecca Sand Hill	<i>Chrysothamnus</i> spp/ <i>Bromus tectorum</i> - <i>Stipa comata</i>
8-2	Rebecca Sand Hill	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Stipa comata</i>
12	Cherry Gulch NE	<i>Purshia tridentata</i> / <i>Bromus tectorum</i>
16	Sagebrush Hill	<i>Purshia tridentata</i> / <i>Bromus tectorum</i>
20-1	Sand Hollow	<i>Purshia tridentata</i> / <i>Bromus tectorum</i> - <i>Poa secunda</i>
20-2	Sand Hollow	<i>Artemisia tridentata</i> / <i>Bromus tectorum</i> - <i>Sporobolus cryptandrus</i>

Table 13. Plant community changes at Mulford's milkvetch monitoring transects, 2005. Weiser area transects not included because baseline plant community information was collected in 2005. Changes in presence/absence or abundance of native annual forbs not included due to their naturally ephemeral life history.

Transect	Occurrence	Plant community changes 2005 vs. previous monitoring years
Boise Foothills		
15-1	Seaman Gulch	Increase in <i>Bromus tectorum</i> cover; Decrease in <i>Aristida longiseta</i> cover; Decrease in bare ground cover; Increase in moss/lichen cover
18-1 & 2	Middle Stewart Gulch	<i>Lactuca serriola</i> recorded for first time
700-1	MR-Powderhouse Gulch	Decrease in bare ground cover; Increase in litter cover
701-1 & 2	MR-Veterans Ridge	Decrease in <i>Bromus tectorum</i> cover; Decrease in <i>Aristida longiseta</i> cover; Increase in <i>Vulpia bromoides</i> cover
705	MR-Cemetery Ridge E	Decrease in <i>Bromus tectorum</i> cover; <i>Poa bulbosa</i> recorded for first time
706-1	MR-Cemetery Ridge W	<i>Centaurea cyanus</i> recorded for first time
708-1	Lower Hulls Gulch	<i>Chondrilla juncea</i> appears to be increasing
715-1	Camels Back Reserve	Decrease in <i>Bromus tectorum</i> cover
715-2	Camels Back Reserve	<i>Centaurea cyanus</i> recorded for first time; <i>Lactuca serriola</i> recorded for first time
715-3	Camels Back Reserve	<i>Lactuca serriola</i> recorded for first time
Owyhee Front		
2-1	South of Sugar Valley	Baseline information collected in 2005
4-1	Horse Hill	Increase in <i>Bromus tectorum</i> cover
9-1 & 2	Mud Flat Road	No change
10-1	Vinson Wash	<i>Salsola tragus</i> recorded for first time
10-2	Vinson Wash	<i>Kochia scoparia</i> recorded for first time; <i>Salsola tragus</i> recorded for first time
11-1	Twentymile Gulch	Increase in <i>Bromus tectorum</i> cover; <i>Sisybrium altissimum</i> recorded for first time
13-1	Con Shea Basin	<i>Lactuca serriola</i> recorded for first time
14-1	Noble Island	<i>Lactuca serriola</i> recorded for first time; <i>Sisybrium altissimum</i> recorded for first time
22-1	SE of Guffey Butte	Decrease in bare ground cover; Increase in moss/lichen cover
23-1	West of Shoofly Creek	Increase in <i>Bromus tectorum</i> cover; <i>Sisybrium altissimum</i> recorded for first time
24-1	Twentymile Gulch N	Baseline information collected in 2005
25-1	Lower Vinson Wash	No change
26-1	Sandhill Point	Increase in <i>Bromus tectorum</i> cover; <i>Sisybrium altissimum</i> recorded for first time

Table 14. Population, habitat, and disturbance trends for Mulford's milkvetch transects with at least three years of monitoring data.

Occurrence name (transect)	Trend		
	Population	Habitat	Disturbance
Boise Foothills			
Seamans Gulch (15-1)	0	0	0
Middle Stewart Gulch (18-1)	+	0	+/-
Middle Stewart Gulch (18-2)	-	+/-	+/-
Lower Powderhouse Gulch (700-1)	-	+/-	+/-
MRP- Veterans Ridge (701-1)	-	+/-	-
MRP- Veterans Ridge (701-2)	0	-	+/-
MRP – Cemetery Ridge W (706-1)	-	+	+/-
Lower Hulls Gulch (708-1)	0	+/-	-
Camels Back Reserve (715-1)	+/-	-	0
Camels Back Reserve (715-2)	0	+/-	+/-
Camels Back Reserve (715-3)	0	+/-	+/-
Owyhee Front			
Vinson Wash (10-1)	-	0	0
Vinson Wash (10-2)	+	0	0
Con Shea Basin (13-1)	0	+	+/-
Noble Island (14-1)	0	+	+/-
SE of Guffey Butte (22-1)	0	0	0
Lower Vinson Wash (25-1)	0	0	0

+ = improving trend; - = declining trend; +/- = no clear trend; 0 = stable trend

Figure 1. Distribution of Mulford's milkvetch in Idaho.

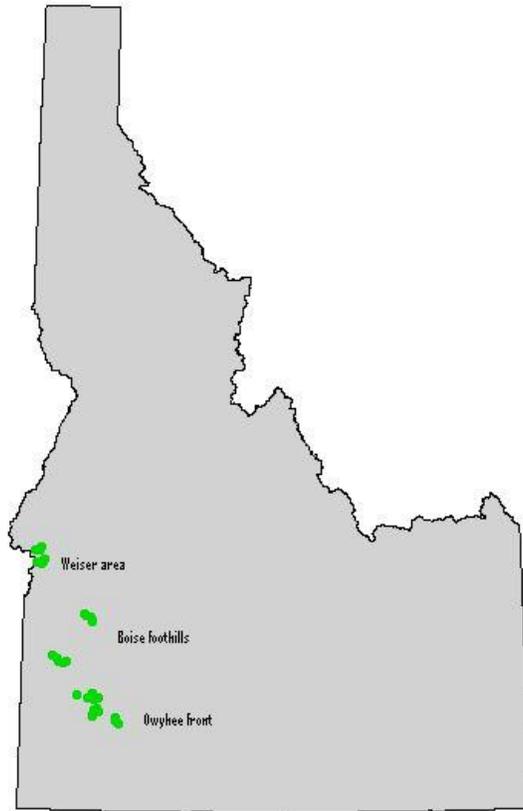
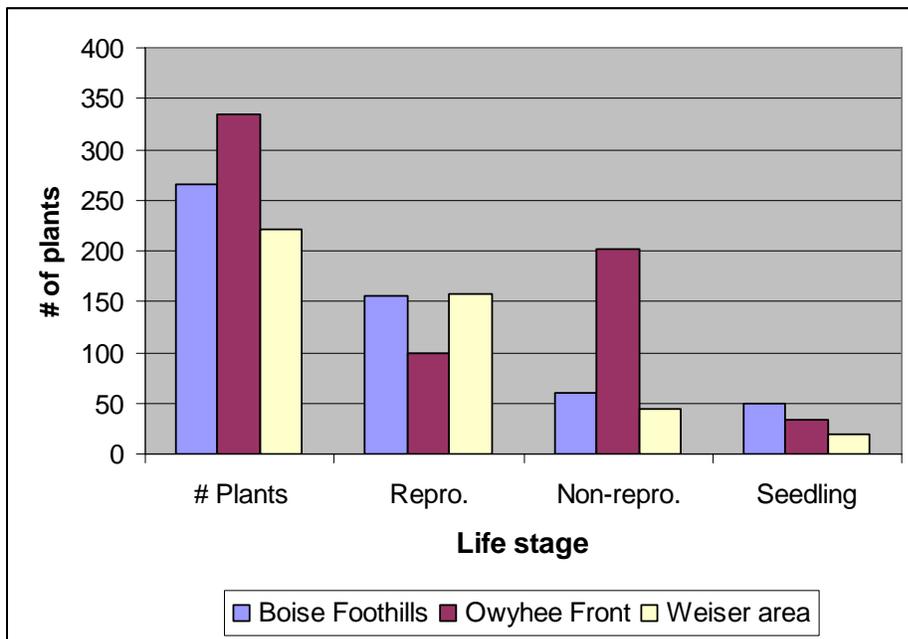


Figure 2. Mulford's milkvetch life stage census information by geographic region, 2005. N = 821 plants.



Appendix 1

Transect sampling information.

Appendix 2

Map locations for Mulford's milkvetch monitoring transects.

Appendix 3

Mulford's milkvetch monitoring transect location forms.

Appendix 4

Mulford's milkvetch census monitoring data sheets, 2005.

Appendix 5

Disturbance factor monitoring data sheets, 2005.

Appendix 6

Introduced weed species dataset for all monitoring years.

Appendix 7

Ground disturbance dataset for all monitoring years.

Appendix 8

Plant community monitoring data sheets, 2005.

Appendix 9

Plant community dataset for all monitoring years.